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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,291	10/08/2001	Wei-Fan Chen	B-4333 619139-6	6023

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EXAMINER
SOWARD, IDA M

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 09/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/973,291	CHEN ET AL.
	Examiner	Art Unit
	Ida M Soward	2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered tim
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 07-18-03 .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the m closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-35 is/are pending in the application.

4a) Of the above claim(s) 15-35 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-14 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 08 October 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

This Office Action is in response to the election filed July 18, 2003.

Election/Restrictions

Applicant's election with traverse of claims 1-14 in Paper No. 4 is acknowledged. The traversal is on the ground(s) that the claims, while distinct, are sufficiently related that it would not be an undue burden upon the Examiner to examine both sets of claims in a single application. This is not found persuasive because claims 1-14 and claims 15-35 are specifically different embodiments.

The requirement is still deemed proper and is therefore made FINAL.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 36 on page 9, line 10. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: "**DSD**" should have be **ESD** on page 16, line 12.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 recites the limitation "the at least one first island breakdown-enhanced layer" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 1, 3, 5, 7-9 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsue et al. (5,559,352) in view of Hokazono et al. (US 2003/0141551 A1).

Hsue et al. teach a MOS structure for ESD protection, comprising : an active region, defined on a substrate 14 of a second-type conductivity; a channel region separating the active region into a first drain/source region and a second drain/source region; at least one first island 20, formed on the first drain/source region and having a first conductive segment and a first gate oxide segment of the first thickness, the first

conductive segment being stacked on the first gate oxide segment; a doped drain region 28 of a first-type conductivity in the first drain/source region, defined substantially by a field oxide region 16, the channel region and the at least one first island; and a breakdown-enhanced layer 36, formed in the first drain/source region and contacting the doped drain region, the reduce a breakdown voltage across the doped drain region and the substrate; the breakdown-enhanced layer is formed under the doped drain region; the channel region has gate structure consisting of a second conductive segment and a second gate oxide segment, the second conductive segment being stacked on the second gate oxide segment; the second gate oxide and the first gate oxide have the same thickness; the breakdown-enhanced layer not formed in the second drain/source region; and the channel region has a field oxide stacked on the substrate. However, Hsue et al. fail to teach a breakdown-enhanced layer having the first-type conductivity. Hokazono et al. teach interchangeable conductivity types (page 3, paragraph [0046]). Since Hsue et al. and Hokazono et al. are from the same field of endeavor (MOS structures for ESD protection), the purpose disclosed by Hokazono et al. would have been recognized in the pertinent art of Hsue et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the inventions was made to modify the MOS structures for ESD protection of Hsue et al. by incorporating the interchangeable conductivity type of Hokazono et al. because the use of one or the other conductivity type is done for the sake of clarity (page 3, paragraph [0046]).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsue et al. (5,559,352) and Hokazono et al. (US 2003/0141551 A1) as applied to claim 1 above, and further in view of Ker et al. (US 2002/0076876 A1).

Hsue et al. and Hokazono et al. teach all mentioned in the rejection above. However, Hsue et al. and Hokazono et al. fail to teach one breakdown-enhanced layer inside the first drain/source region while another is outside the first drain/source region. Ker et al. teach a MOS structure having, within the active region, two breakdown-enhanced layers 105 with the same depth and the same dosage, and one the breakdown-enhanced layers inside the first drain/source region while another being outside the first drain/source region (Figure 9, pages 2-3, paragraphs [0030]-[0033]). Since Hsue et al., Hokazono et al. and Ker et al. are from the same field of endeavor (MOS structures for ESD protection), the purpose disclosed by Ker et al. would have been recognized in the pertinent art of Hsue et al. and Hokazono et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the MOS structures for ESD protection of Hsue et al. and the interchangeable conductivity type of Hokazono et al. by incorporating the breakdown-enhanced layers of Ker et al. to avoid contact spiking (page 1, paragraph [0008]).

Claims 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsue et al. (5,559,352) and Hokazono et al. (US 2003/0141551 A1) as applied to claim 1 above, and further in view of Chuang et al. (6,008,080).

Hsue et al. and Hokazono et al. teach all mentioned in the rejection above. However, Hsue et al. and Hokazono et al. fail to teach pocket-implanted structures. Chuang et al. teach pocket-implanted structures 49 (Figure 6, col. 9, lines 51-60). Since Hsue et al., Hokazono et al. and Chuang et al. are from the same field of endeavor (MOS structures for ESD protection), the purpose disclosed by Chuang et al. would have been recognized in the pertinent art of Hsue et al. and Hokazono et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the MOS structures for ESD protection of Hsue et al. and the interchangeable conductivity type of Hokazono et al. by incorporating the pocket-implanted structures of Chuang et al. to limit the punch through effect (col. 9, lines 43-44).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsue et al. (5,559,352) and Hokazono et al. (US 2003/0141551 A1) as applied to claim 1 above, and further in view of Kuo (US 6,268,256 B1).

Hsue et al. and Hokazono et al. teach all mentioned in the rejection above. However, Hsue et al. and Hokazono et al. fail to teach anti-punch-through structures of internal MOS. Kuo teaches an anti-punch-through structure 13 of internal MOS (Figure 2F, col. 3, lines 45-67). Since Hsue et al., Hokazono et al. and Kuo are from the same field of endeavor (MOS structures), the purpose disclosed by Kuo would have been recognized in the pertinent art of Hsue et al. and Hokazono et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was

made to modify the MOS structures for ESD protection of Hsue et al. and the interchangeable conductivity type of Hokazono et al. by incorporating the anti-punch-through structure of Kuo to increase MOS performance (col. 4, lines 29-33).

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsue et al. (5,559,352) and Hokazono et al. (US 2003/0141551 A1) as applied to claim 1 above, and further in view of Hsu (6,100,141).

Hsue et al. and Hokazono et al. teach all mentioned in the rejection above. However, Hsue et al. and Hokazono et al. fail to teach different gate oxide thickness. Hsu teaches a second gate oxide 308 and a first gate oxide 310 having a different thickness, wherein the second gate oxide is thicker than the first gate oxide (Figures 3C-3H, cols. 3-4, lines 66-67 and 1-59, respectively). Since Hsue et al., Hokazono et al. and Hsu are from the same field of endeavor (ESD MOS structures), the purpose disclosed by Hsu would have been recognized in the pertinent art of Hsue et al. and Hokazono et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the MOS structures for ESD protection of Hsue et al. and the interchangeable conductivity type of Hokazono et al. by incorporating the gate oxide thickness of Hsu to lower threshold voltage (col. 2, lines 30-40).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respects to MOS structures for ESD protection:

Ker et al. (US 6,514,839 B1)

Lee et al. (US 6,171,891 B1)

Watt (5,701,024)

Wu et al. (US 6,444,511 B1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M Soward whose telephone number is 703-305-3308. The examiner can normally be reached on Monday - Thursday, 6:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

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August 21, 2003